



Office of Energy & Infrastructure (E&I)
Bureau for Economic Growth, Education and Environment (E3)

THE FUNDAMENTALS OF ENERGY SYSTEMS FOR PROGRAM MANAGERS

March 14 - 17, 2016

1250 H Street, NW
Suite 510
Washington, DC 20005

Monday, March 14

Development Challenges: Improving Electricity Access and Developing Energy Projects

- 8:30 – 8:45 **Registration**
- 8:45 – 9:00 **Conference Kick-off and Welcome**
Charles North, E3/Senior Deputy Assistance Administrator
Jeffrey Haeni, E3/E&I/Energy Division
- 9:00 – 10:00 **Keynote: Commissioner Fort, Public Service Commission of the District of Columbia**

Session: Commissioner Fort will share her thoughts and experiences with issues related to unbundling, rooftop PV, etc.
- 10:00 – 10:30 **Welcome, Course Overview, Trainer/Participant Introductions**
Facilitator: Ellen Dragotto, E3/E&I/Energy Division
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- 10:30 – 10:45 Coffee Break
- 10:45 – 11:30 **The Importance of Energy for International Development**
Presenter: Allen Eisendrath, E3/Global Climate Change

Session: Affordable and reliable energy is a key input to modern society, affecting all areas in which USAID works. This session reviews how energy affects health, education, governance, commerce, industry, public services and security, and the environment. This session also discusses the critical relationship of energy systems to USAID's priority sector objectives for clean energy, improved energy access, economic development, and energy for reconstruction.
- ACTIVITY** **Q and A:** How is energy important for development objectives in your country? (5 minutes)
- 11:30 – 12:15 **The Context of Global Development Challenges: Improving Energy Access**
Presenter: Jeff Haeni, E3/E&I/Energy Division

Session: What do we mean by energy access and what populations are most affected by insufficient access to energy? What kinds of fiscal resources are necessary to achieve universal energy access? What are the benefits to developing countries for increasing energy access to underserved populations? Will universal access involve expansion of existing electrical grids or widespread implementation of off-grid renewable systems?

12:15 – 1:00 Lunch

- 1:00 – 2:00 **Understanding and Evaluating Cost Elements in Electricity Systems**
Presenter: Allen Eisendrath, E3/Global Climate Change

Session: What are the costs associated with electricity systems and what drives these costs across different systems? How do we determine reasonable unit prices for electricity services, given these costs? How can we evaluate these costs across different electricity systems? This session provides tools to answer these questions by looking at the entire electricity value chain, beginning with construction, operations and delivery of services. What is a levelized cost? How do system costs generally compare with generation costs? What is cost recovery? And how do system losses affect cost recovery?

2:00 – 2:30

Development Credit Authority's (DCA) Energy Portfolio

Presenters: Scott Haller and Andrew Gisselquist, E3/Development Credit Authority

Session: How we can use DCA credit guarantees in the energy sector? Discuss DCA's strategy and interaction with Power Africa and other energy initiatives in the Agency.

2:30 – 3:30

Energy Project Development Drivers: Private Sector Perspectives

Presenter: Steve Burns, E&E/Chief, Energy and Infrastructure

Session: How does the private sector consider development options? What additional elements are embedded in levelized cost of energy calculations, and how will these elements influence project development? What are the implications for clean energy development, and how can USAID programming address private sector concerns?

3:30 – 3:45

Coffee Break

3:45 – 4:45

Principles of Project Finance for Energy Projects

Presenter: TBD

Session: Project Finance is a special form of bank financing where debt is provided to develop a project solely based on the project's perceived risks and expected future cash flows via negotiated contractual arrangements. In the absence of an optimal legal and institutional enabling environment, this session reviews how Public Private Partnerships (PPPs) are set up to attract finance for energy projects, the essential ingredients power projects must have in order to attract finance, credit enhancement and tax incentive support host governments can provide to the project, and how project risks can be mitigated.

4:45 – 5:00

Review, Knowledge Check, and Survey

Tuesday, March 15

Modern Power Systems: Renewable Energy and Improved Electricity Grids

8:30 – 9:00

Summary of Day 1 Topics: Overview of today's topics and learning outcomes

Ellen Dragotto, E3/E&I/Energy Division and Brenda Maday, COP ESTL, Engility

9:00 – 10:00

Understanding Transactions in Energy Systems

Presenter: Tony Iskarpotyoti, Nexant

Session: Power sector transactions can be explained by analyzing 4 topics, and this session examines: (i) the methods governments can use to attract project developers to sponsor new power projects, (ii) where equity and debt can be obtained for new power projects, (iii) the steps typically undertaken to actually raise the required finance, and (iv) financial modeling techniques (stress tests and sensitivity analysis) and how they affect a project's anticipated financial performance from the perspective of all 3 stakeholders (the project developers, the banks, or the government).

10:00-10:45

Macro Influences on the Cost of Power Systems

Presenter: Steve Burns, E&E/Chief, Energy and Infrastructure

Session: What are the main operational price drivers in energy system costs? What are the costs associated with main types of electricity generation fuels such as coal, oil, natural gas and renewables? How do variations in fuel

prices influence generation costs and planning for future power demands? How do embedded costs influence generation costs and decisions? What is the role of market forces in setting electricity prices and encouraging cleaner energy provision?

10:45 – 11:00 Coffee Break

11:00- 12:00 **Electricity Market Development: Toward Sustainable Price Structures**
Presenter: Steve Burns, E&E/Chief, Energy and Infrastructure

Session: This session reviews different models for energy market development. Topics include how pricing and regulatory certainty is related to market development. How can rules on equal access and appropriate infrastructure mitigate congestion? What is the role of information and appropriate price signals in market development? What is the role of private investment for improvements in the sector?

12:10 – 1:00 Lunch

Optional Brownbag: Land Tenure and Energy Infrastructure
Presenter: Darryl Vhugen, Consultant and Sarah Lowery, E3/Land

Session: Renewable energy investments can decrease energy poverty, mitigate climate change, and even potentially foster inclusive economic growth if rolled out in ways that benefit local communities. However, land tenure risks are inherent in nearly all infrastructure activities and projects, including energy generation, transmission, and distribution. Using an integrated legal and economic framework, this session will identify land tenure risks and understand best approaches and practices for securing land rights while ensuring sustainability of infrastructure investments, including a couple of case studies where benefits were shared with local communities. Session format will include a presentation, discussion, and an introduction to USAID resources.

1:00 – 2:00 **Challenges for Scaling Up Renewable Energy**
Presenter: Allen Eisendrath, E3/Global Climate Change

Session: This session reviews the scale of renewable projects, looking at small, medium and large scale applications of renewable energy. Renewables have many benefits but how can you scale up variable renewable energy? What are the key challenges they pose for energy systems?

2:00 – 3:00 **Approaches to Incentivizing Renewables**
Presenter: Allen Eisendrath, E3/Global Climate Change

Session: How are variable renewable generation sources integrated into power grids? How can the grid code for renewables be improved? What strategies and policies are available to address problems of intermittency? What regulatory approaches exist to incentivize renewable energy? What are best practices for VRE grid integration? What are the main benefits, cost and challenges facing renewable energy projects in development countries?

3:00 – 3:15 Coffee Break

3:15 – 4:15 **Reverse Auctions – Global Best Practices**
Presenters: TBD

Session: Reverse auctions and competitive procurement of renewable energy in general have proven to be a significant policy tool to drive down prices of solar and wind and encourage large-scale private sector investment. This session will discuss what reverse auctions are, how they are used, and which best practices in auction design have been shown to result in RE scale up.

4:15 – 5:00 **Integrating Distributed Renewable Energy Generation into the Grid: Creating the Right Regulatory Framework for Grid-connected Rooftop PV**
Presenter: Jeffrey Haeni, USAID/E3/E&I/Energy Division

Session: Solar PV is projected to account for the single largest capacity addition globally of any technology by 2030 with rooftop PV comprising over 50% of installed capacity. Rooftop PV offers many benefits and challenges, and

creating the right regulatory environment is critical for successful deployment. This session will examine many of the global best practices regarding incentive frameworks for rooftop PV.

5:00 – 5:15 **Review, Knowledge Check, and Survey**

Wednesday, March 16

Encouraging Market Development and Market Transactions in Energy

8:30 – 8:45 **Summary of Day 2 Topics; Overview of today's topics and learning outcomes**
Ellen Dragotto, E3/E&I/Energy Division and Brenda Maday, COP ESTL, Engility

8:45 – 9:30 **Electricity Sector Reform: Problems and Best Practices**
Presenter: Adrian Rouse, Deloitte

Session: What are the characteristics of poor performing sectors and utilities? What is energy sector reform and what are the elements and steps of a reform process? What is meant by technical and non-technical losses? This session provides an in-depth analysis of the key building blocks for reforming utilities and building the energy sector.

9:30 – 10:15 **Best Practices for Developing Private Power Generation Projects**
Presenter: Adrian Rouse, Deloitte

Session: A successful Independent Power Producer (Program) can expand electricity supplies for developing countries while providing investors with a fair return on their investment and encourage future private investment. Drawing from previous experiences with IPP programs - both successes and failures - this session will explore the necessary factors for effectively designing, negotiating and implementing an IPP.

10:15 – 10:30 Coffee Break

10:30 – 12:00 **Modeling the Financial Viability of the Haiti Caracol Industrial Park (CIP) Utility**
Facilitator: Liz Pfeiffer, Deloitte

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As part of the USG post-quake response, a new mini-utility was developed in the north of Haiti with the support of USAID to provide power to a new industrial park and surrounding communities. It's now operating deep in the red, requiring ongoing financial subsidies from the USG and the Government of Haiti. Using a financial model, participants will explore how changes in the cost of generation, billing and collections, number of customers, and other variables can dramatically impact the tariff that would need to be charged by the CIP utility to achieve financial sustainability.

12:00 – 1:00 Lunch

1:00 – 2:00 **Haiti Fuel for Change Video and Group Discussion**
Facilitator: Tina Balin, DCHA/PPM

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Session: Fuel for Change is a 30 minute documentary on Haiti's charcoal use and deforestation – and how new cooking solutions can help prevent environmental damage and health problems. It's an inspiring story about Haitians taking action and with, a little support from USAID, creating new markets for cooking with gas and improved cookstoves in Port au Prince.

2:00 – 2:45 **Sustainability of USAID Decentralized Energy Projects**
Presenter: Dr. Hisham Zerriffi, University of British Columbia

Session: Results of a recently completed portfolio review of the last 10 years of USAID’s decentralized energy projects.

2:45 – 3:00 Coffee Break

3:00 – 4:00 **Increasing Energy Access: Centralized versus Decentralized Electricity Provision**
Presenter: Jeffrey Haeni, E3/E&I/Energy Division

Session: To understand energy provision in the context of international development, the relationship between grid and off-grid power systems is fundamental. This session reviews conditions about when centralized versus decentralized energy provision is most appropriate. We also show how USAID has encouraged improved energy access, by looking at different examples of micro and mini-grids. This session reviews a variety of regulatory, fiscal and business consideration necessary to support sustainable, decentralized power solutions.

4:00 – 5:00 **How to Promote Energy Services: New Business Models and Financing Techniques**
Presenter: Dr. Ryan Shelby, E3/E&I/Energy Division

Session: A review of energy technologies, business models, and financing for distributed energy systems.

5:00 – 5:15 **Review, Knowledge Check, and Survey**

Thursday, March 17

Improving Development Outcomes: Sustainability Tools

8:30 – 9:00 **Summary of Day 3 Topics; Overview of today’s topics and learning outcomes**
Ellen Dragotto, E3/E&I/Energy Division and Brenda Maday, COP ESTL, Engility

9:00 – 9:30 **Engendering Utilities Activity**
Presenter: Ellen Dragotto, E3/E&I/Energy Division

9:30 – 10:30 **Subsidies in Energy Systems: How to Reduce Subsidies and Improve Tariffs**
Presenter: Michael Cain, Engility

Session: What are energy subsidies? How large are subsidies in developing countries and how are they funded? What are the negative influences of subsidies for electricity provision and market development? How can subsidies be reduced? What restructuring strategies are necessary to successfully implement subsidy reforms? The session will finish by discussing best practices in tariff designs to alleviate harmful subsidies.

10:30 – 10:45 Coffee Break

10:45 – 11:45 **Environmental Compliance in the Energy Sector and Advisory Support**
Presenter: Victor Bullen, USAID/Bureau for Europe and Eurasia

11:45 – 12:30 **Monitoring USAID’s Clean Energy Programming**
Presenters: Kate Faulhaber and Kathryn Stratos, E3/Global Climate Change

Session: Learn about outcomes from the UNFCCC Paris Agreement, and how these are likely to affect climate change mitigation programming and stakeholder engagement. Discuss why Intended Nationally Determined Contributions (INDCs) are important and the movement toward economy-wide policies and objectives.

As part of its international and internal commitments, USAID energy programs will need to track dollars leveraged for clean and cleaner energy investments, MW of capacity added, INDCs supported and GHGs reduced. This session will review new indicators, tools, and data collection requirements for clean energy programming.

12:30 – 1:30 Lunch

1:30 – 2:30

Energy Efficiency and Demand Side Management Toolkit

Presenter: Aleisha Khan, ICF

Session: What is energy efficiency? What is demand side management? How can we improve energy efficiency on the demand side of the power sector? How can demand side efficiencies be achieved in industrial, commercial and residential end-use markets? What are the best practices for regulatory policies that support utility investment in energy efficiency? What are the best practices in program planning, design and implementation?

2:45 – 3:45

Regional Market integration: Promoting Cross-Border Trade through Electricity Market Monitoring – South East Europe Experience

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Facilitators: Steve Burns, E&E/Chief, Energy and Infrastructure and Robert A. Sinclair, Ph.D., Vice President, Potomac Economics

Session: Participants will be introduced to the basic approach to combat corruption and monitor cross-border transmission access in South East Europe. The session will be interactive and participants will be asked to analyze results of actual market violations in the region.

3:45 – 4:00

Jeopardy

4:00 – 4:15

Remarks and certificates

Darren Manning, Acting Director, E3/Office of Energy and Infrastructure

4:15 – 4:45

Discussion: What we learned. What we still need to learn.

Ellen Dragotto, E3/E&I/Energy Division and Brenda Maday, COP ESTL, Engility

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Discussion on course improvements and additional tools needed (workshop, online courses, toolkit, etc.)